

CLAIM AMENDMENTS

1 1.-46. (Canceled)

1 47. (Canceled)

1 48.-63. (Canceled)

1 64. (Canceled)

1 65.-76. (Canceled)

1 77. (Canceled)

1 78.-89. (Canceled)

1 90. (Canceled)

1 91.-95. (Canceled).

1 96. (New) A server for storing Web objects in co-located positions on a storage device,
2 comprising:
3 a processor;
4 one or more stored sequences of instructions which, when executed by the processor,
5 cause the processor to perform the steps of:
6 receiving, at a server from a first client device, a first request for a first Web object;
7 in response to the first request,
8 the server obtaining the first Web object and a second Web object; and
9 the server sending to the first client device the first Web object and the second
10 Web object;
11 the server identifying that the second Web object is embedded within the first Web
12 object;
13 the server causing the first Web object to be stored as a first file in a first location on
14 the storage device;

15 the server causing the second Web object to be stored as a second file in a second
16 location on the storage device, wherein the second location is selected to be
17 co-located with respect to the first location in response to identifying that the
18 second Web object is embedded within the first Web object;
19 receiving, at the server from a second client device, a second request for the first Web
20 object; and
21 in response to the second request,
22 the server obtaining the first Web object by causing the first file to be read
23 from the storage device in a first read operation;
24 the server obtaining the second Web object by causing the second file to be
25 read from the storage device in a second read operation; and
26 the server sending to the second client device the first Web object and the
27 second Web object.

- 1 97. (New) A server as recited in Claim 96, wherein:
2 the first location is co-located with respect to the second location on the storage device
3 because the first location and second location are associated with a
4 relationship; and
5 the relationship is selected from the group consisting of:
6 (a) the first location and the second location are located within a first track of
7 the storage device;
8 (b) the first location is within a first sector of a second track of the storage
9 device, the second location is within a second sector of the second track
10 of the storage device, and the first sector is contiguous with the second
11 sector;
12 (c) the first location is within a third track of the storage device, the second
13 location is within a fourth track of the storage device, and the third
14 track is adjacent to the fourth track;
15 (d) the first location is within a first cylinder of the storage device, the second
16 location is within a second cylinder of the storage device, and the first
17 cylinder is adjacent to the second cylinder;

18 (e) the first location and the second location are located within a third cylinder
19 of the storage device; and
20 (f) the first location is within a fourth cylinder of the storage device, the second
21 location is within a fifth cylinder of the storage device, and the fourth
22 cylinder is closely spaced with respect to the fifth cylinder.

1 98. (New) A server as recited in Claim 96, further comprising:
2 the storage device; and
3 wherein the server is selected from the group consisting of a Web caching server, a
4 Web caching proxy, a Web content server, and a Web origin server.

1 99. (New) A server as recited in Claim 96, wherein:
2 the first Web object is a Web page;
3 the second Web object is a component of the Web page;
4 the component of the Web page is associated with a file type that is selected from the
5 group consisting of a text file type, an image file type, an audio file type, and a
6 video file type; and
7 the Web page and the component of the Web page have correlated retrieval times as a
8 result of the component of the Web page being embedded within the Web
9 page.

1 100. (New) A server as recited in Claim 96, wherein:
2 the first Web object is a Web page;
3 the Web page includes a hyper-link to the second Web object; and
4 the Web page and the second Web object have correlated retrieval times as a result of
5 the Web page including the hyper-link to second Web object.

1 101. (New) A server as recited in Claim 96, wherein:
2 the first Web object is a first Web page;
3 the second Web object is a second Web page; and

4 the first Web page and the second Web page have correlated retrieval times as a result
5 of the second Web page being embedded within the first Web page.

1 102. (New) A server as recited in Claim 96, wherein:

2 the first Web object is a first Web page;

3 the second Web object is a second Web page; and

4 the server further comprising sequences of instructions which, when executed by the

5 processor, cause the processor to perform the steps of:

6 the server identifying that a third Web page is embedded within the second

7 Web page;

8 the server obtaining the third Web page; and

9 the server causing the third Web page to be stored as a third file in a third

10 location on the storage device, wherein the third location is selected to

11 be co-located with respect to the second location because the third Web

12 page is embedded within the second Web page.

1 103. (New) A server as recited in Claim 96, wherein:

2 the first location is a first storage location;

3 the second location is a second storage location;

4 the sequences of instructions that cause the processor to perform the step of the server

5 causing the first Web object to be stored as the first file in the first storage

6 location further comprise sequences of instructions which, when executed by

7 the processor, cause the processor to perform the steps of:

8 the server causing the first Web object to be stored in a first temporary

9 location; and

10 the server causing the first Web object to be moved from the first temporary

11 location to the first storage location;

12 the sequences of instructions that cause the processor to perform the step of the server

13 causing the second Web object to be stored as a second file in the second

14 storage location further comprise sequences of instructions which, when

15 executed by the processor, cause the processor to perform the steps of:

16 the server causing the second Web object to be stored in a second temporary
17 location; and
18 the server causing the second Web object to be moved from the second
19 temporary location to the second storage location.

1 104. (New) A server as recited in Claim 103, further comprising:
2 a memory, wherein the first temporary location and the second temporary location are
3 both within the memory.

1 105. (New) A server as recited in Claim 103, wherein:
2 the first temporary location and the second temporary location are both on the storage
3 device.

1 106. (New) A server as recited in Claim 96, further comprising sequences of instructions
2 which, when executed by the processor, cause the processor to perform the steps of:
3 determining that a criterion is satisfied;
4 based on the criterion being satisfied,
5 the server causing the first Web object to be stored as the first file in the first
6 location on the storage device; and
7 the server causing the second Web object to be stored as the second file in the
8 second location on the storage device.

1 107. (New) A server as recited in Claim 106, wherein the criterion is satisfied when the
2 second Web object is the only embedded Web object within the first Web object.

1 108. (New) A server as recited in Claim 106, wherein:
2 the first location is a first storage location;
3 the second location is a second storage location;
4 the sequences of instructions that cause the processor to perform the step of the server
5 causing the first Web object to be stored as the first file in the first storage
6 location further comprise sequences of instructions which, when executed by
7 the processor, cause the processor to perform the steps of:

8 the server causing the first Web object to be stored in a first temporary
9 location; and
10 the server causing the first Web object to be moved from the first temporary
11 location to the first storage location;
12 the sequences of instructions that cause the processor to perform the step of the server
13 causing the second Web object to be stored as a second file in the second
14 storage location further comprise sequences of instructions which, when
15 executed by the processor, cause the processor to perform the steps of:
16 the server causing the second Web object to be stored in a second temporary
17 location; and
18 the server causing the second Web object to be moved from the second
19 temporary location to the second storage location;
20 the first temporary location and the second temporary location are both within a
21 portion of memory; and
22 the criterion is satisfied when the portion of memory is full.

1 109. (New) A server as recited in Claim 106, wherein:
2 the first location is a first storage location;
3 the second location is a second storage location;
4 the sequences of instructions that cause the processor to perform the step of the server
5 causing the first Web object to be stored as the first file in the first storage
6 location further comprise sequences of instructions which, when executed by
7 the processor, cause the processor to perform the steps of:
8 the server causing the first Web object to be stored in a first temporary
9 location; and
10 the server causing the first Web object to be moved from the first temporary
11 location to the first storage location;
12 the sequences of instructions that cause the processor to perform the step of the server
13 causing the second Web object to be stored as a second file in the second
14 storage location further comprise sequences of instructions which, when
15 executed by the processor, cause the processor to perform the steps of:

16 the server causing the second Web object to be stored in a second temporary
17 location; and
18 the server causing the second Web object to be moved from the second
19 temporary location to the second storage location;
20 the first temporary location and the second temporary location are both on the storage
21 device;
22 the storage device is included in the server;
23 the server is a Web caching server; and
24 the criterion is satisfied when the Web caching server is processing a number of
25 requests that is below a specified value.

1 110. (New) An apparatus for storing Web objects in co-located positions on a storage
2 device, comprising:
3 means for receiving, at a server from a first client device, a first request for a first Web
4 object;
5 means for, in response to the first request,
6 the server obtaining the first Web object and a second Web object; and
7 the server sending to the first client device the first Web object and the second
8 Web object;
9 means for the server identifying that the second Web object is embedded within the
10 first Web object;
11 means for the server causing the first Web object to be stored as a first file in a first
12 location on the storage device;
13 means for the server causing the second Web object to be stored as a second file in a
14 second location on the storage device, wherein the second location is selected
15 to be co-located with respect to the first location in response to identifying that
16 the second Web object is embedded within the first Web object;
17 means for receiving, at the server from a second client device, a second request for the
18 first Web object; and
19 means for, in response to the second request,

20 the server obtaining the first Web object by causing the first file to be read
21 from the storage device in a first read operation;
22 the server obtaining the second Web object by causing the second file to be
23 read from the storage device in a second read operation; and
24 the server sending to the second client device the first Web object and the
25 second Web object.

1 111. (New) An apparatus as recited in Claim 110, wherein:

2 the first location is co-located with respect to the second location on the storage device
3 because the first location and second location are associated with a
4 relationship; and

5 the relationship is selected from the group consisting of:

6 (a) the first location and the second location are located within a first track of
7 the storage device;

8 (b) the first location is within a first sector of a second track of the storage
9 device, the second location is within a second sector of the second track
10 of the storage device, and the first sector is contiguous with the second
11 sector;

12 (c) the first location is within a third track of the storage device, the second
13 location is within a fourth track of the storage device, and the third
14 track is adjacent to the fourth track;

15 (d) the first location is within a first cylinder of the storage device, the second
16 location is within a second cylinder of the storage device, and the first
17 cylinder is adjacent to the second cylinder;

18 (e) the first location and the second location are located within a third cylinder
19 of the storage device; and

20 (f) the first location is within a fourth cylinder of the storage device, the second
21 location is within a fifth cylinder of the storage device, and the fourth
22 cylinder is closely spaced with respect to the fifth cylinder.

1 112. (New) An apparatus as recited in Claim 110, wherein:
2 the server is selected from the group consisting of a Web caching server, a Web
3 caching proxy, a Web content server, and a Web origin server; and
4 the server includes the storage device.

1 113. (New) An apparatus as recited in Claim 110, wherein:
2 the first Web object is a Web page;
3 the second Web object is a component of the Web page;
4 the component of the Web page is associated with a file type that is selected from the
5 group consisting of a text file type, an image file type, an audio file type, and a
6 video file type; and
7 the Web page and the component of the Web page have correlated retrieval times as a
8 result of the component of the Web page being embedded within the Web
9 page.

1 114. (New) An apparatus as recited in Claim 110, wherein:
2 the first Web object is a Web page;
3 the Web page includes a hyper-link to the second Web object; and
4 the Web page and the second Web object have correlated retrieval times as a result of
5 the Web page including the hyper-link to second Web object.

1 115. (New) An apparatus as recited in Claim 110, wherein:
2 the first Web object is a first Web page;
3 the second Web object is a second Web page; and
4 the first Web page and the second Web page have correlated retrieval times as a result
5 of the second Web page being embedded within the first Web page.

1 116. (New) An apparatus as recited in Claim 110, wherein:
2 the first Web object is a first Web page;
3 the second Web object is a second Web page; and
4 the apparatus further comprises:

means for the server identifying that a third Web page is embedded within the
second Web page;

means for the server obtaining the third Web page; and

means for the server causing the third Web page to be stored as a third file in a
third location on the storage device, wherein the third location is
selected to be co-located with respect to the second location because the
third Web page is embedded within the second Web page.

117. (New) An apparatus as recited in Claim 110, wherein:

the first location is a first storage location;

the second location is a second storage location;

the means for the server causing the first Web object to be stored as the first file in the
first storage location further comprises:

means for the server causing the first Web object to be stored in a first
temporary location; and

means for the server causing the first Web object to be moved from the first
temporary location to the first storage location;

the means for the server causing the second Web object to be stored as a second file in
the second storage location further comprises:

means for the server causing the second Web object to be stored in a second
temporary location; and

means for the server causing the second Web object to be moved from the
second temporary location to the second storage location.

118. (New) An apparatus as recited in Claim 117, wherein:

the first temporary location and the second temporary location are both within a
memory;

the memory is included in the server.

1 119. (New) An apparatus as recited in Claim 117, wherein:
2 the first temporary location and the second temporary location are both on the storage
3 device.

1 120. (New) An apparatus as recited in Claim 110, further comprising:
2 means for determining that a criterion is satisfied;
3 means for, based on the criterion being satisfied,
4 the server causing the first Web object to be stored as the first file in the first
5 location on the storage device; and
6 the server causing the second Web object to be stored as the second file in the
7 second location on the storage device.

1 121. (New) An apparatus as recited in Claim 120, wherein the criterion is satisfied when
2 the second Web object is the only embedded Web object within the first Web object.

1 122. (New) An apparatus as recited in Claim 120, wherein:
2 the first location is a first storage location;
3 the second location is a second storage location;
4 the means for the server causing the first Web object to be stored as the first file in the
5 first storage location further comprises:
6 means for the server causing the first Web object to be stored in a first
7 temporary location; and
8 means for the server causing the first Web object to be moved from the first
9 temporary location to the first storage location;
10 the means for the server causing the second Web object to be stored as a second file in
11 the second storage location further comprises:
12 means for the server causing the second Web object to be stored in a second
13 temporary location; and
14 means for the server causing the second Web object to be moved from the
15 second temporary location to the second storage location;

16 the first temporary location and the second temporary location are both within a
17 portion of memory; and
18 the criterion is satisfied when the portion of memory is full.

1 123. (New) An apparatus as recited in Claim 120, wherein:
2 the first location is a first storage location;
3 the second location is a second storage location;
4 the means for the server causing the first Web object to be stored as the first file in the
5 first storage location further comprises:
6 means for the server causing the first Web object to be stored in a first
7 temporary location; and
8 means for the server causing the first Web object to be moved from the first
9 temporary location to the first storage location;
10 the means for the server causing the second Web object to be stored as a second file in
11 the second storage location further comprises:
12 means for the server causing the second Web object to be stored in a second
13 temporary location; and
14 means for the server causing the second Web object to be moved from the
15 second temporary location to the second storage location;
16 the first temporary location and the second temporary location are both on the storage
17 device;
18 the storage device is included in the server;
19 the server is a Web caching server; and
20 the criterion is satisfied when the Web caching server is processing a number of
21 requests that is below a specified value.

1 124. (New) A computer-readable storage medium carrying one or more sequences of
2 instructions for storing Web objects in co-located positions on a storage device, which
3 instructions, when executed by one or more processors, cause the one or more
4 processors to perform the steps of:
5 receiving, at a server from a first client device, a first request for a first Web object;

6 in response to the first request,
7 the server obtaining the first Web object and a second Web object; and
8 the server sending to the first client device the first Web object and the second
9 Web object;
10 the server identifying that the second Web object is embedded within the first Web
11 object;
12 the server causing the first Web object to be stored as a first file in a first location on
13 the storage device;
14 the server causing the second Web object to be stored as a second file in a second
15 location on the storage device, wherein the second location is selected to be
16 co-located with respect to the first location in response to identifying that the
17 second Web object is embedded within the first Web object;
18 receiving, at the server from a second client device, a second request for the first Web
19 object; and
20 in response to the second request,
21 the server obtaining the first Web object by causing the first file to be read
22 from the storage device in a first read operation;
23 the server obtaining the second Web object by causing the second file to be
24 read from the storage device in a second read operation; and
25 the server sending to the second client device the first Web object and the
26 second Web object.

- 1 125. (New) A computer-readable storage medium as recited in Claim 124, wherein:
2 the first location is co-located with respect to the second location on the storage device
3 because the first location and second location are associated with a
4 relationship; and
5 the relationship is selected from the group consisting of:
6 (a) the first location and the second location are located within a first track of
7 the storage device;

- 8 (b) the first location is within a first sector of a second track of the storage
9 device, the second location is within a second sector of the second track
10 of the storage device, and the first sector is contiguous with the second
11 sector;
12 (c) the first location is within a third track of the storage device, the second
13 location is within a fourth track of the storage device, and the third
14 track is adjacent to the fourth track;
15 (d) the first location is within a first cylinder of the storage device, the second
16 location is within a second cylinder of the storage device, and the first
17 cylinder is adjacent to the second cylinder;
18 (e) the first location and the second location are located within a third cylinder
19 of the storage device; and
20 (f) the first location is within a fourth cylinder of the storage device, the second
21 location is within a fifth cylinder of the storage device, and the fourth
22 cylinder is closely spaced with respect to the fifth cylinder.

1 126. (New) A computer-readable storage medium as recited in Claim 124, wherein:
2 the server is selected from the group consisting of a Web caching server, a Web
3 caching proxy, a Web content server, and a Web origin server; and
4 the server includes the storage device.

1 127. (New) A computer-readable storage medium as recited in Claim 124, wherein:
2 the first Web object is a Web page;
3 the second Web object is a component of the Web page;
4 the component of the Web page is associated with a file type that is selected from the
5 group consisting of a text file type, an image file type, an audio file type, and a
6 video file type; and
7 the Web page and the component of the Web page have correlated retrieval times as a
8 result of the component of the Web page being embedded within the Web
9 page.

1 128. (New) A computer-readable storage medium as recited in Claim 124, wherein:
2 the first Web object is a Web page;
3 the Web page includes a hyper-link to the second Web object; and
4 the Web page and the second Web object have correlated retrieval times as a result of
5 the Web page including the hyper-link to second Web object.

1 129. (New) A computer-readable storage medium as recited in Claim 124, wherein:
2 the first Web object is a first Web page;
3 the second Web object is a second Web page; and
4 the first Web page and the second Web page have correlated retrieval times as a result
5 of the second Web page being embedded within the first Web page.

1 130. (New) A computer-readable storage medium as recited in Claim 124, wherein:
2 the first Web object is a first Web page;
3 the second Web object is a second Web page; and
4 the computer-readable storage medium further comprises instructions which, when
5 executed by the one or more processors, cause the one or more processors to
6 perform the steps of:
7 the server identifying that a third Web page is embedded within the second
8 Web page;
9 the server obtaining the third Web page; and
10 the server causing the third Web page to be stored as a third file in a third
11 location on the storage device, wherein the third location is selected to
12 be co-located with respect to the second location because the third Web
13 page is embedded within the second Web page.

1 131. (New) A computer-readable storage medium as recited in Claim 124, wherein:
2 the first location is a first storage location;
3 the second location is a second storage location;

4 the instructions for the server causing the first Web object to be stored as the first file
5 in the first storage location further comprise instructions for performing the
6 steps of:

7 the server causing the first Web object to be stored in a first temporary
8 location; and

9 the server causing the first Web object to be moved from the first temporary
10 location to the first storage location;

11 the instructions for the server causing the second Web object to be stored as a second
12 file in the second storage location further comprise instructions for performing
13 the steps of:

14 the server causing the second Web object to be stored in a second temporary
15 location; and

16 the server causing the second Web object to be moved from the second
17 temporary location to the second storage location.

1 132. (New) A computer-readable storage medium as recited in Claim 131, wherein:
2 the first temporary location and the second temporary location are both within a
3 memory;
4 the memory is included in the server.

1 133. (New) A computer-readable storage medium as recited in Claim 131, wherein:
2 the first temporary location and the second temporary location are both on the storage
3 device.

1 134. (New) A computer-readable storage medium as recited in Claim 124, further
2 comprising instructions which, when executed by the one or more processors, cause
3 the one or more processors to perform the steps of:
4 determining that a criterion is satisfied;
5 based on the criterion being satisfied,
6 the server causing the first Web object to be stored as the first file in the first
7 location on the storage device; and

8 the server causing the second Web object to be stored as the second file in the
9 second location on the storage device.

1 135. (New) A computer-readable storage medium as recited in Claim 134, wherein the
2 criterion is satisfied when the second Web object is the only embedded Web object
3 within the first Web object.

1 136. (New) A computer-readable storage medium as recited in Claim 134, wherein:
2 the first location is a first storage location;
3 the second location is a second storage location;
4 the instructions for the server causing the first Web object to be stored as the first file
5 in the first storage location further comprise instructions for performing the
6 steps of:
7 the server causing the first Web object to be stored in a first temporary
8 location; and
9 the server causing the first Web object to be moved from the first temporary
10 location to the first storage location;
11 the instructions for the server causing the second Web object to be stored as a second
12 file in the second storage location further comprise instructions for performing
13 the steps of:
14 the server causing the second Web object to be stored in a second temporary
15 location; and
16 the server causing the second Web object to be moved from the second
17 temporary location to the second storage location;
18 the first temporary location and the second temporary location are both within a
19 portion of memory; and
20 the criterion is satisfied when the portion of memory is full.

1 137. (New) A computer-readable storage medium as recited in Claim 134, wherein:
2 the first location is a first storage location;
3 the second location is a second storage location;

4 the instructions for the server causing the first Web object to be stored as the first file
5 in the first storage location further comprise instructions for performing the
6 steps of:
7 the server causing the first Web object to be stored in a first temporary
8 location; and
9 the server causing the first Web object to be moved from the first temporary
10 location to the first storage location;
11 the instructions for the server causing the second Web object to be stored as a second
12 file in the second storage location further comprise instructions for performing
13 the steps of:
14 the server causing the second Web object to be stored in a second temporary
15 location; and
16 the server causing the second Web object to be moved from the second
17 temporary location to the second storage location;
18 the first temporary location and the second temporary location are both on the storage
19 device;
20 the storage device is included in the server;
21 the server is a Web caching server; and
22 the criterion is satisfied when the Web caching server is processing a number of
23 requests that is below a specified value.

1 138. (New) A method for storing Web objects in co-located positions on a storage device,
2 comprising:
3 receiving, at a server from a first client device, a first request for a first Web object;
4 in response to the first request,
5 the server obtaining the first Web object and a second Web object; and
6 the server sending to the first client device the first Web object and the second
7 Web object;
8 the server identifying that the second Web object is embedded within the first Web
9 object;

10 the server causing the first Web object to be stored as a first file in a first location on
11 the storage device;
12 the server causing the second Web object to be stored as a second file in a second
13 location on the storage device, wherein the second location is selected to be
14 co-located with respect to the first location in response to identifying that the
15 second Web object is embedded within the first Web object;
16 receiving, at the server from a second client device, a second request for the first Web
17 object; and
18 in response to the second request,
19 the server obtaining the first Web object by causing the first file to be read
20 from the storage device in a first read operation;
21 the server obtaining the second Web object by causing the second file to be
22 read from the storage device in a second read operation; and
23 the server sending to the second client device the first Web object and the
24 second Web object.

1 139. (New) A method as recited in Claim 138, wherein:
2 the first location is a first storage location;
3 the second location is a second storage location;
4 the server causing the first Web object to be stored as the first file in the first storage
5 location further comprises:
6 the server causing the first Web object to be stored in a first temporary
7 location; and
8 the server causing the first Web object to be moved from the first temporary
9 location to the first storage location;
10 the server causing the second Web object to be stored as a second file in the second
11 storage location further comprises:
12 the server causing the second Web object to be stored in a second temporary
13 location; and
14 the server causing the second Web object to be moved from the second
15 temporary location to the second storage location.

- 1 140. (New) A method as recited in Claim 139, wherein:
2 the first temporary location and the second temporary location are both within a
3 memory;
4 the memory is included in the server.
- 1 141. (New) A method as recited in Claim 139, wherein:
2 the first temporary location and the second temporary location are both on the storage
3 device.